Hardware User's Manual

Active & passive avoidance box

Shuttle box

References:

LE916 (76-0250), LE918 (76-0251)

Version:

V28/10/2014

Panlab | Harvard Apparatus

Panlab, s.l.u
C/Energía, 112
08940 Cornellà de Ll.(Barcelona)
Spain
www.panlab.com

International Calls: +34 934 750 697
Domestic Call: 934 190 709
Fax: +34 934 750 699
Info@panlab.com

Limitation of Liability

PANLAB does not accept responsibility, under any circumstances, for any harm or damage caused directly or indirectly by the incorrect interpretation of what is expressed in the pages of this manual.
Some symbols may have more than one interpretation by professionals unaccustomed to their usage.
PANLAB reserves the right to modify, in part or in total, the contents of this document without notice.

1. SYMBOLS TABLE

Recognising the symbols used in the manual will help to understand their meaning:

DESCRIPTION	SYMBOL
Warning about operations that must not be done because they can damage the equipment	
Warning about operations that must be done, otherwise the user can be exposed to a hazard.	
Protection terminal ground connection.	
Warning about a hot surface which temperature may exceed 65°C	
Warning about a metal surface that can supply electrical shock when it's touched.	
Decontamination of equipments prior to disposal at the end of their operative life	
Waste Electrical and Electronic Equipment Directive (WEEE)	

2. GOOD LABORATORY PRACTICE

Check all units periodically and after periods of storage to ensure they are still fit for purpose. Investigate all failures which may indicate a need for service or repair.

Good laboratory practice recommends that the unit be periodically serviced to ensure the unit is suitable for purpose. You must follow preventive maintenance instructions. In case equipment has to be serviced you can arrange this through your distributor. Prior to Inspection, Servicing, Repair or Return of Laboratory Equipment the unit must be cleaned and decontaminated.

Decontamination prior to equipment disposal

In use this product may have been in contact with bio hazardous materials and might therefore carry infectious material. Before disposal the unit and accessories should all be thoroughly decontaminated according to your local environmental safety laws.

3. UNPACKING AND EQUIPMENT INSTALATION

WARNING: Failure to follow the instructions in this section may cause equipment faults or injury to the user.

A. No special equipment is required for lifting but you should consult your local regulations for safe handling and lifting of the equipment.
B. Inspect the instrument for any signs of damage caused during transit. If any damage is discovered, do not use the instrument and report the problem to your supplier.
C. Ensure all transport locks are removed before use. The original packing has been especially designed to protect the instrument during transportation. It is therefore recommended to keep the original carton with its foam parts and accessories box for re-use in case of future shipments. Warranty claims are void if improper packing results in damage during transport.
D. Place the equipment on a flat surface and leave at least 10 cm of free space between the rear panel of the device and the wall. Never place the equipment in zones with vibration or direct sunlight.
E. Once the equipment is installed in the final place, the main power switch must be easily accessible.
F. Only use power cords that have been supplied with the equipment. In case that you have to replace them, the spare ones must have the same specs that the original ones.
G. Make sure that the AC voltage in the electrical network is the same as the voltage selected in the equipment. **Never connect the equipment to a power outlet with voltage outside these limits.**

WARNING

For electrical safety reasons you only can connect equipment to power outlets provided with earth connections .
This equipment can be used in installations with category II over-voltage according to the General Safety Rules.

The manufacturer accepts no responsibility for improper use of the equipment or the consequences of use other than that for which it has been designed.

PC Control

Some of these instruments are designed to be controlled from a PC. To preserve the integrity of the equipment it is essential that the attached PC itself conforms to basic safety and EMC standards and is set up in accordance with the manufacturers' instructions. If in doubt consult the information that came with your PC. In common with all computer operation the following safety precautions are advised.

WARNING

- To reduce the chance of eye strain, set up the PC display with the correct viewing position, free from glare and with appropriate brightness and contrast settings

- To reduce the chance of physical strain, set up the PC display, keyboard and mouse with correct ergonomic positioning, according to your local safety guidelines.

Class A equipment is intended for use in an industrial environment.

WARNING

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with these instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

4. MAINTENANCE

WARNING: Failure to follow the instructions in this section may cause equipment fault.

- PRESS KEYS SOFTLY – Lightly pressing the keys is sufficient to activate them.
- Equipments do not require being disinfected, but cleaned for removing urine, faeces and odour. To do so, we recommend using a wet cloth or paper with soap (which has no strong odour). NEVER USE ABRASIVE PRODUCTS OR DISSOLVENTS.
- NEVER pour water or liquids on the equipment.
- Once you have finished using the equipment turn it off with the main switch. Clean and check the equipment so that it is in optimal condition for its next use.
- The user is only authorised to replace fuses with the specified type when necessary.

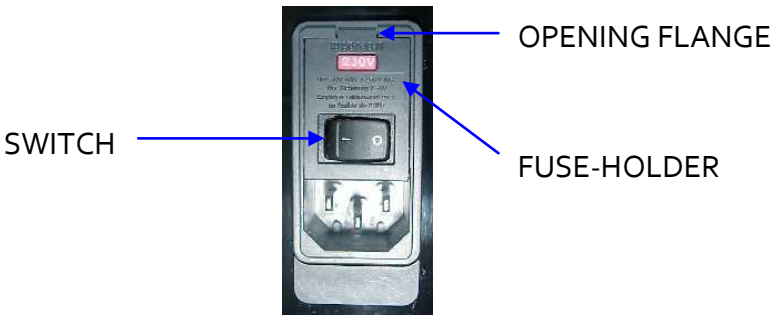


Figure 1. Power inlet, main switch and fuse holder.

FUSE REPLACEMENT

In case of an over-voltage or other incident in the AC net making it impossible to turn on the equipment, check fuses according to the following procedure.

1 Remove power cord from the power inlet

2 Open fuse-holder by pulling the flange with a regular screwdriver

Figure 2. Open fuse-holder door.

3 Extract fuse holder using the screwdriver.

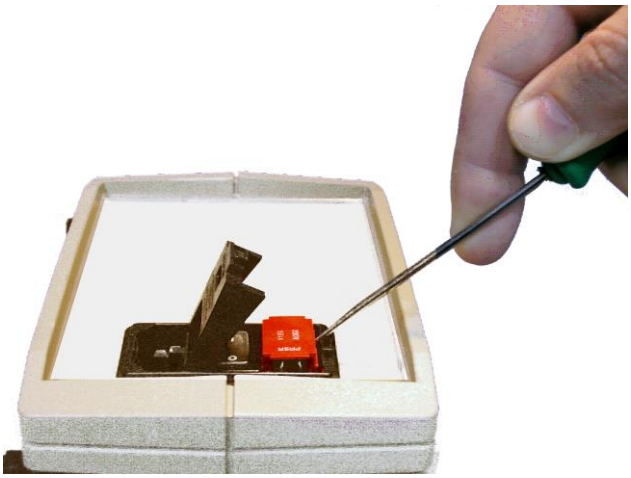
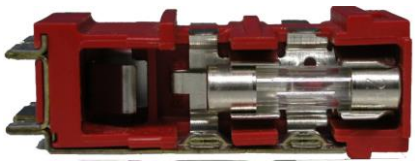


Figure 3. Extract fuse-holder.

4 Replace fuses if necessary. Insert fuses in the fuse-holder in the correct position.

CORRECT



INCORRECT

Figure 4. Fuses position.

5 Insert again fuse-holder, both possible positions are correct because power supply is universal.

6 If the fuses blow again unplug the equipment and contact technical service.

WARNING

For electrical safety, never open the equipment. The power supply has dangerous voltages.

5. TABLE OF CONTENTS

1. SYMBOLS TABLE 2

2. GOOD LABORATORY PRACTICE 2

3. UNPACKING AND EQUIPMENT INSTALATION 3

4. MAINTENANCE 5

5. TABLE OF CONTENTS 7

6. INTRODUCTION 9

7. EQUIPMENT DESCRIPTION 10

7.1. LE 900 FRONT PANEL 10

7.2. LE900 REAR PANEL 11

7.3. EXPERIMENTATION CAGE 12

8. EQUIPMENT CONNECTION 14

8.1. CONTROL BY COMPUTER 14

8.2. CONTROL WITH LE 2708 17

9. AUDIO STIMULUS 19

10. WORKING WITH THE EQUIPMENT 20

10.1. PROCEDURE 20

10.2. AUTOMATIC ERROR WARNING 21

11. RECOMMENDATIONS 22

11.1. GRIDS CLEANING 22

11.2. TRAYS CLEANING 22

11.3. TRNASPARENT DOORS CLEANING 23

11.4. WALLS CLEANING 23

11.5. CLEANING THE ROUND TOP LIDS 23

12. TROUBLESHOOTING 24

13. PREVENTIVE MAINTENANCE 26

14. TECHNICAL SPECIFICATIONS 27

6. INTRODUCTION

The Shuttle Box (or Avoidance and Escape Cage) is designed to study and monitor the movements of an animal between two cages separated by a door, resulting from the negative reinforcement caused by electrical shock (on both sides of the cage) and the conditioned stimuli that help it to escape from the discharge. Thus, the goal of a Shuttle Box experiment is to test animal response to signals (acoustic and visual in the case of this appliance).

Figure 5. Shuttle Box.

There are 2 cage models; the smaller unit, LE 918, is designed for mice and the larger one, LE 916, is designed for rats. Control unit LE 900 can work with both cage models by means of a switch labelled **BOX** on the rear panel (Rat/Mouse).

Animal position detection is based on load cells. To do so, the grid is placed on a tray with 4 legs that transmit force to the load cell. Adjustment of load change detection is automatic.

There are two options to control the experiment:

- Connect the LE 900 to the LE 2708 programmer through the DB15 female connector labelled LE 2708 (each programmer can control 1 cage).
- Connect the LE 900 to the serial port of computer and use the **Shutavoid** software (each computer can control up to 8 cages).

The shock is supplied to the cage using the LE 100-26 shocker. Optionally, a motor can be installed to open/close the door that separates both sides.

7. EQUIPMENT DESCRIPTION

7.1. LE 900 FRONT PANEL

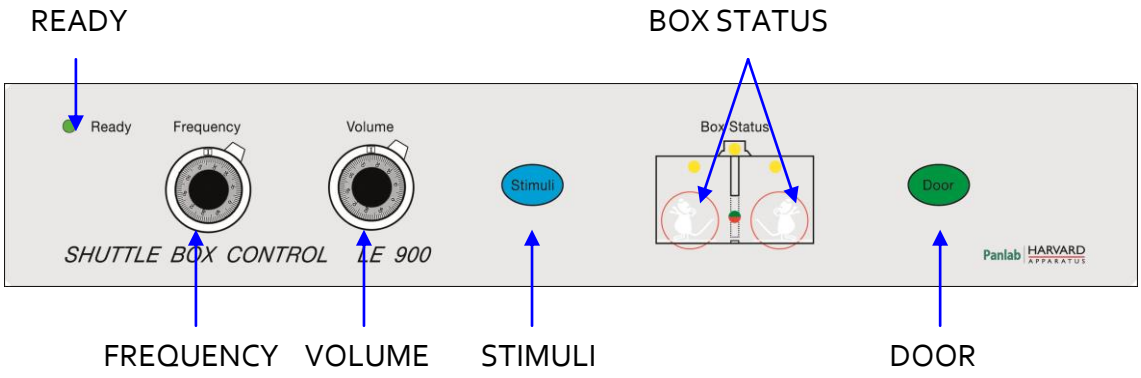


Figure 6. LE 900 front panel.

- **READY:** Green led. When the LE 900 is turned on it blinks for 20 seconds indicating that system is auto-calibrating. After this period it remains continuously on, indicating that the system is ready to work.
- **FREQUENCY:** 10-turn potentiometer used to adjust frequency of the acoustic stimulus (from 300 Hz to 3 kHz).
- **VOLUME:** 10-turn potentiometer used to adjust acoustic stimulus volume.
- **STIMULI:** Button used to test acoustic and visual stimuli in the cage.
- **BOX STATUS:** Seven leds that show box status (when light and sound stimuli are on, when door is closed and animal position).

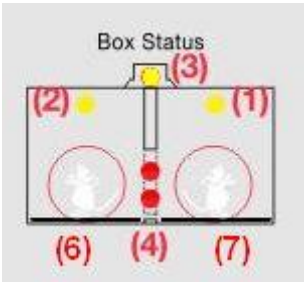


Figure 7. Box Status leds.

- Visual stimuli on right side **(1)** and left side **(2)** (yellow colour leds).
- Acoustic Stimuli **(3)** (yellow colour led).
- Door closed **(4)** (red colour leds).
- Animal position, left **(6)** or right **(7)** (white colour leds).

- **DOOR:** Button used to test the door. It will open or close depending on the original position.

7.2. LE900 REAR PANEL

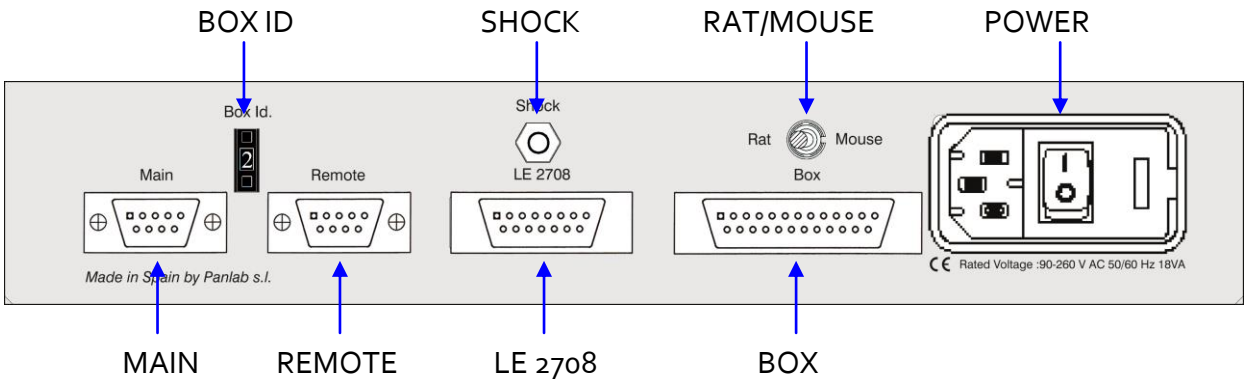


Figure 8. Control unit Rear Panel.

- **BOX ID:** Decimal selector used when the system is controlled by computer. When several cages are connected to the same computer there cannot be 2 cages with same ID number.

- **MAIN:** DB9 female connector used to connect LE 900 to the serial port of the computer. When the computer controls several control units connected in cascade, the serial port of the computer is connected to the MAIN port of the first control unit, and the MAIN port of the next control unit is connected to the REMOTE port of the previous control unit. The REMOTE port of the last control unit is left free.

- **REMOTE:** DB9 male connector used to connect the control unit to the MAIN port of next control unit when several cages are controlled by a computer. The REMOTE port of the last control unit is left free.

- **LE 2708:** DB15 female connector used to connect the control unit to the LE 2708 programmer when control is not done by computer.

- **BOX:** DB25 female connector used to connect the control unit to the experimentation cage. It transmits load cell signals, stimuli and door activation signals.

- **SHOCK:** It connects the LE 900 with the LE 100-26 Shocker. It sends the signal to activate the shocker.

- **RAT/MOUSE:** Selector used to set the model of cage being used (rat or mouse).

- **POWER:** Power inlet, main switch and fuse holder.

7.3. EXPERIMENTATION CAGE

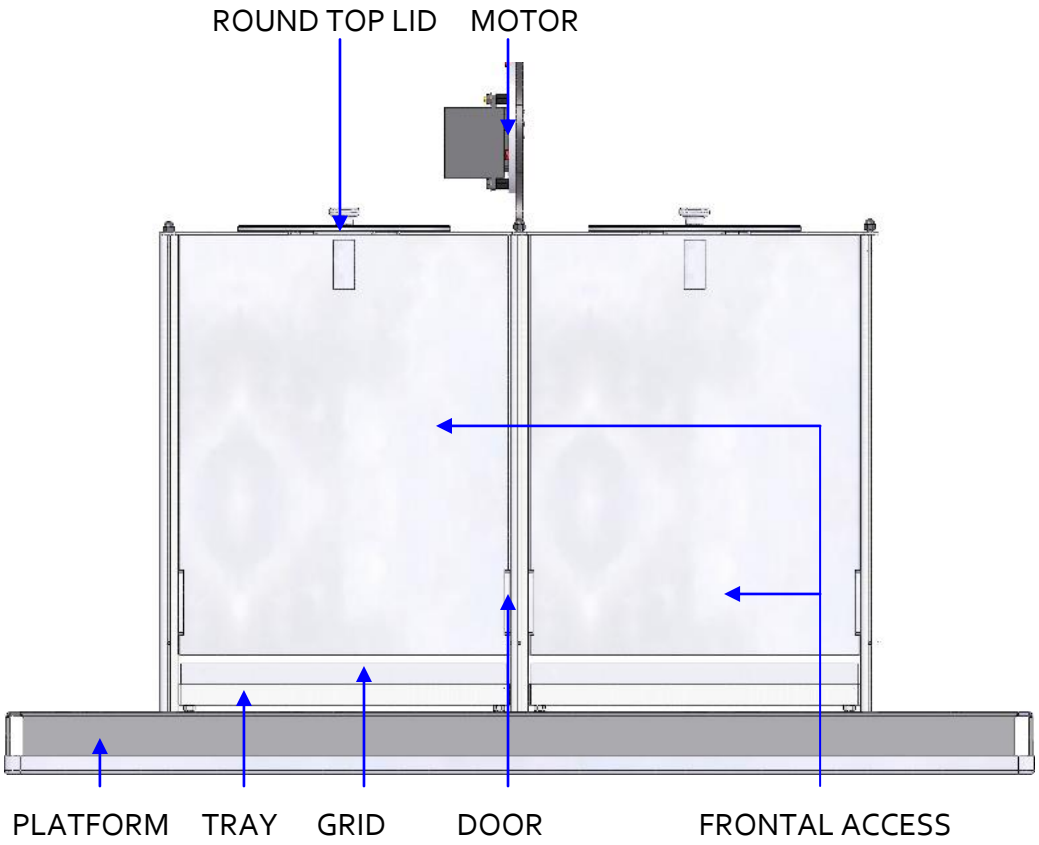


Figure 9. Cage front view.

- **LIGHT:** There are 2 lights, one on each side of the cage for visual stimulus.
- **ROUND TOP LID:** There is a round transparent top lid on each side of the cage. In order to remove it you should turn the round lid till the notches of it match with the holes in the cover.
- **SPEAKER:** There is a speaker for acoustic stimulus at the centre of the rear wall.
- **PLATFORM:** The platform is the floor of the cage. It contains the load cells (one for each side).
- **TRAY:** The tray collects animal droppings. It can be removed for cleaning the cage. It also has 4 legs that transmit weight to the load cell. It contains the electrical grid.
- **GRID:** The grid transmits electrical shock to the animal. The bars are equipped with a scramble of 6 elements to ensure that the animal receives shock.

- **FRONTAL ACCESS:** There are 2 transparent frontal doors to introduce and remove animals to and from the cage.

- **DOOR:** The door is an accessory. When it is installed it has a motor to open/close it.

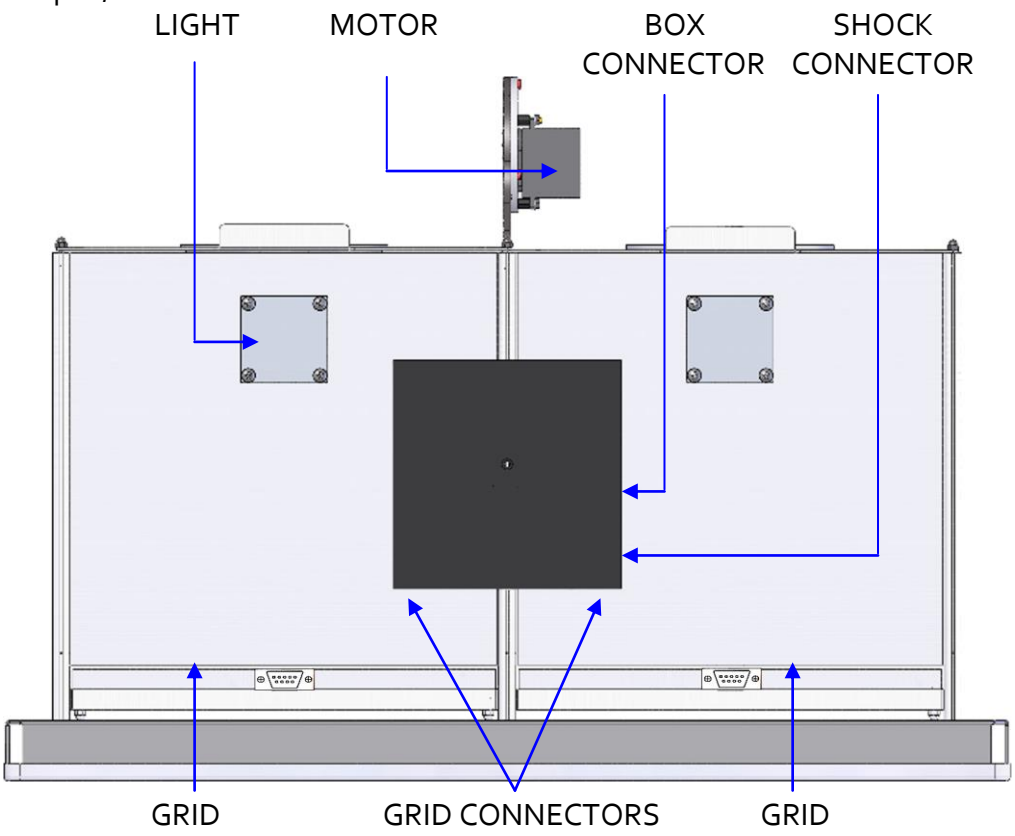


Figure 10. Cage rear view.

There is a central box that contains all the connections at the rear of the cage:

- **MOTOR CONNECTOR:** DB9 female connector at the top side for connecting door motor.

- **LIGHT CONNECTORS:** 2 female jacks at the top side for connecting the lights of each side.

- **BOX CONNECTOR:** DB25 male connector to connect cage to the control unit.

- **SHOCK CONNECTOR:** DIN6 female connector used to connect the cage to the LE 100-26 Shocker or LE 2708 programmer.

- **GRID CONNECTORS:** 2 DB9 female connectors located on the bottom for transmitting shock to each grid.

There is a speaker inside the connection box on the rear panel of the cage. It is used to give acoustic stimulation to the animal.

8. EQUIPMENT CONNECTION

8.1. CONTROL BY COMPUTER

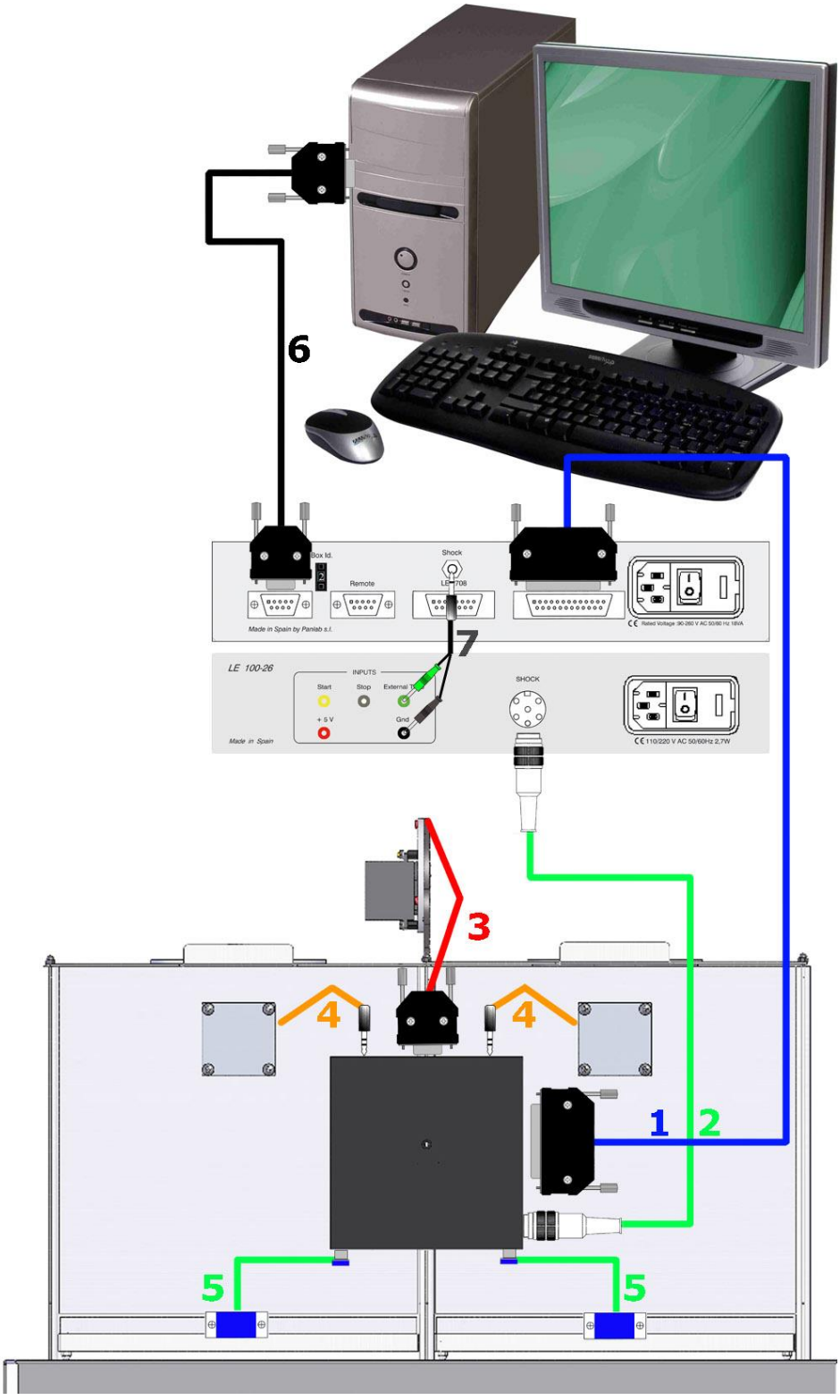


Figure 11. Connections schematic for control by computer.

The connections and cables necessary for controlling the Shuttle Box by computer are the following:

	FROM	TO	CABLE
1	LE 900 BOX	CAGE BOX	DB25 cable
2	LE 100-26 SHOCK	CAGE SHOCK	DIN6 cable
3	MOTOR	CAGE	DB9 cable [1]
4	LIGHT (left/right)	CAGE	Jack cable
5	GRID (left/ right)	CAGE	DB9 flat cable
6	LE 900 MAIN	PC SERIAL PORT	RS-232 cable
7	LE 900 Shock	LE 100-26 External Time & GND	Jack to green and black banana cable

A computer is able to control up to 8 cages. When working with several cages, connection between control units and the computer is as follows (an example of connection of 3 cages is shown in Figure 12).

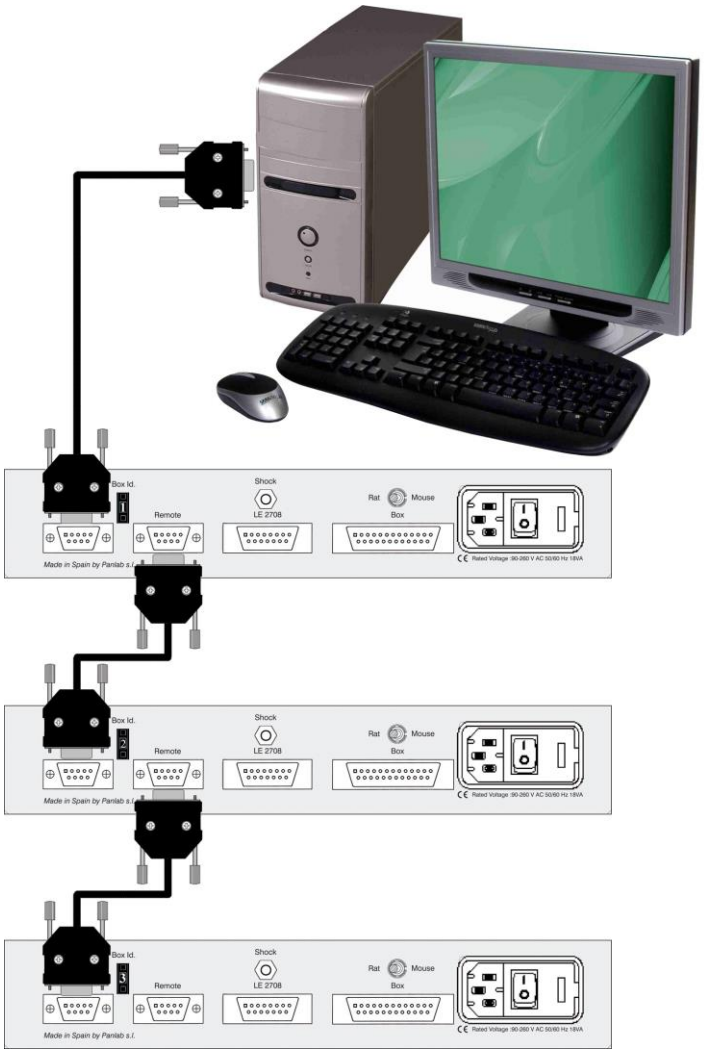


Figure 12. Example: Control of 3 cages with the same computer.

[1] This cable is optional. Shuttle Box experiments always use an opened door.

Some important points must be followed when working with more than one cage:

- All the units must have different IDs so that computer can identify them.
- It is not necessary for all ID numbers to be correlative. For example, it is as correct to work with cages 1, 2 and 3 as it is to work with cages 1, 5 and 7.
- It is not necessary for cages to be physically located in order of their ID numbers. For example it will be correct to work with cages 1-2-3, 1-3-2, 2-1-3, 2-3-1, 3-1-2 or 3-2-1.
- The computer serial port is always connected to the MAIN port of the first control unit.
- The REMOTE port of each control unit is always connected to the MAIN port of the next control unit.
- The REMOTE port of the last control unit is left free.

8.2. CONTROL WITH LE 2708

Each LE 2708 can only control one cage. The necessary connections are shown in the next figure:

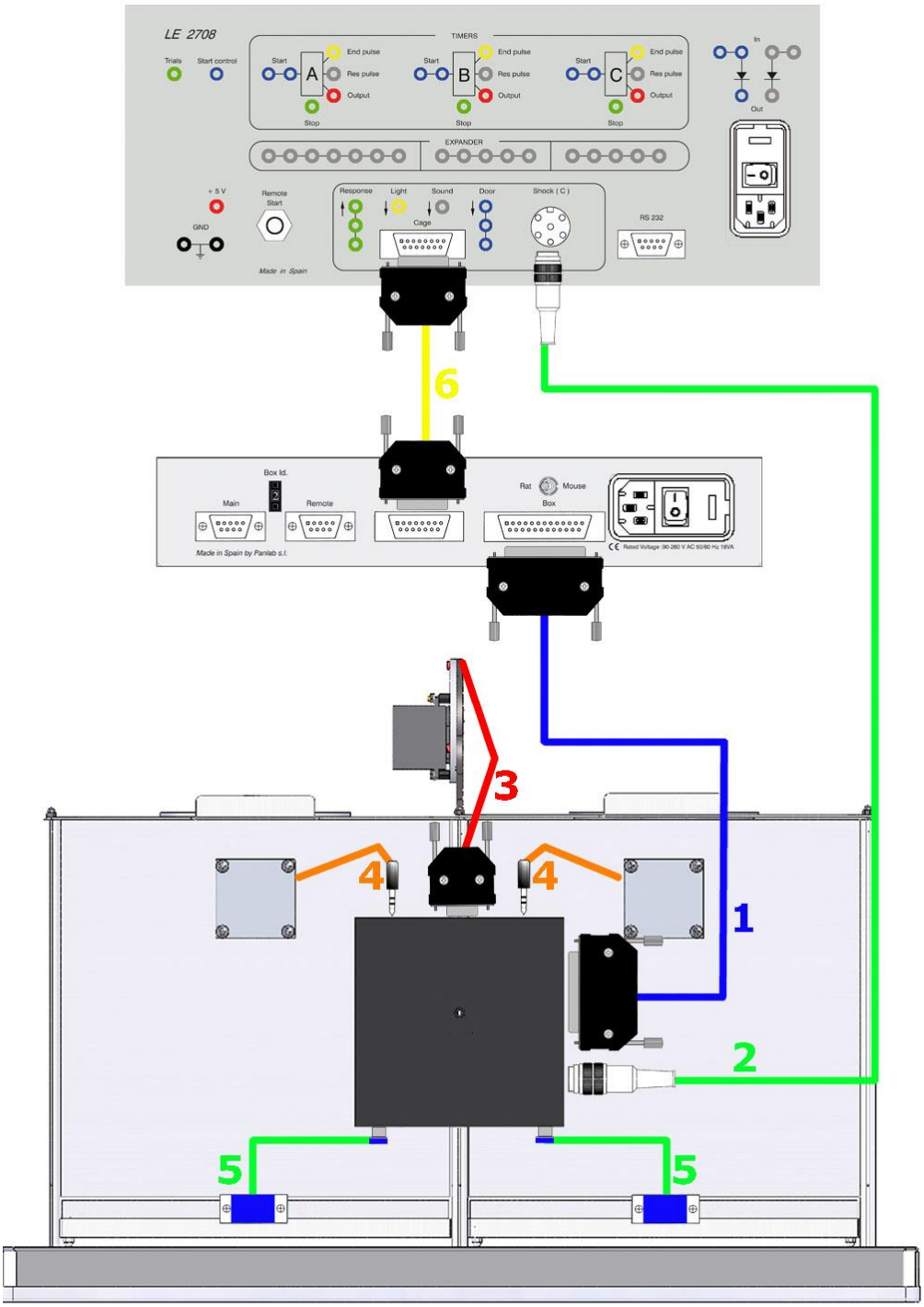


Figure 13. Control with LE 2708.

The connections necessary to program an LE 2708 are not detailed in this manual. If you need further information please read the LE 2708 **Quick Procedure**.

The necessary connections and cables are listed in the next table:

	FROM	TO	CABLR
1	LE 900 BOX	CAGE BOX	DB25 cable
2	LE 2708 SHOCK	CAGE SHOCK	DIN6 cable
3	MOTOR	CAGE	DB9 cable [2]
4	LIGHT (left / right)	CAGE	Jack cable
5	GRID (left / right)	CAGE	DB9 flat cable
6	LE 2708 CAGE	LE 900 (LE 2708)	DB15 cable

[2] This cable is optional. Shuttle Box experiments always use an opened door.

9. AUDIO STIMULUS

The audio stimulus can be modified with the two 10-turn dials on the front panel:

- **Frequency:** This dial adjusts frequency from 300 Hz to 3 kHz.
- **Volume:** This dial adjusts sound volume.

The frequency dial is linear, and frequency can be calculated with the following equation:

$$f = 270 * D + 300$$

Where:

f: frequency in Hertz.
D: Value of the frequency dial.

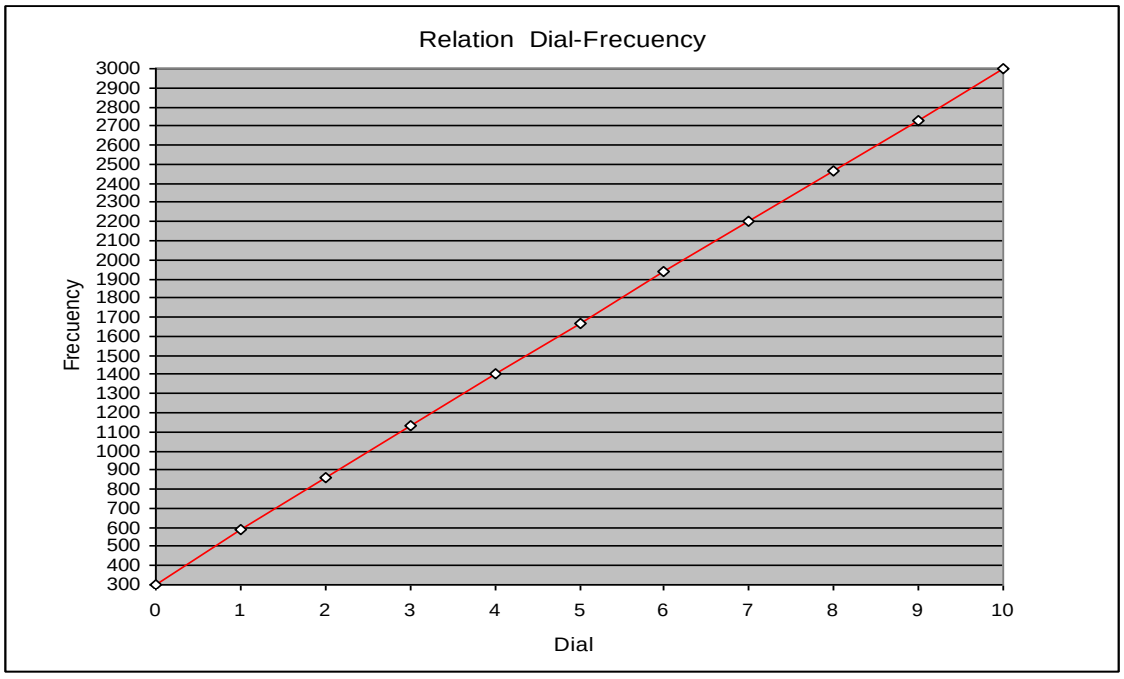


Figure 14. Graphical representation of frequency vs. value of the dial.

Figure 14 shows the graphical representation of frequency vs. the value set in the dial.

10. WORKING WITH THE EQUIPMENT

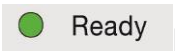
10.1. PROCEDURE

The following procedure must be followed to work with the equipment:

1 Connect all the cables (see chapter 8 in this manual).

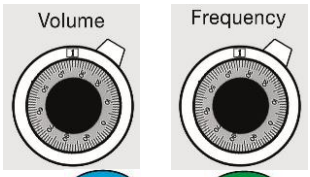
2 If you work with the program **Shutavoid** and several control units, choose a different ID for each cage.

3 Connect control unit to AC network and turn it on.

4 Wait a few seconds until the 

led is continuously on. It will blink during auto-calibration.

5 Adjust Volume and Frequency of acoustic stimulus using the 2 dials on the front panel.



6 Light, sound and door can be tested using the buttons labelled

and

in the front panel.

7 If you are working with a rat cage, select **Rat** on the rear panel selector. If you are working with a mouse cage, select **Mouse** on the same selector.

8 Place the animal in the cage.

9 Follow the **Shutavoid** program or **LE 2708** indications for experimenting with the animal (read related manual depending on the equipment you have purchased).

10 Remove the animal form the cage once the experiment is ended and clean grids and trays.

11 Return to point number 8 to work with the next animal.

12 Once the experiment has finished, turn off all equipment and clean the cage.

10.2. AUTOMATIC ERROR WARNING

The system checks if the cable between the rear panel connector labelled **Box** and the cage is connected.

If the system detects this error, the 2 white position leds in the **Status box** on the front panel (see Figure 7) will flash. The system is then waiting for the problem to be solved (cable connected). After solving the problem, the system must be turned on again.

Once the cable is connected, if the system detects that a load cell is damaged it will warn the user with a flashing white led in the position that belongs to this load cell (see Figure 7).

11. RECOMMENDATIONS

1. It will be necessary to periodically clean the experimentation cage.

2. Trays and grids can be removed for cleaning. Prior to removing them, turn off the control unit and disconnect the flat cables that join the cage with the 2 shock grids.

3. Once grids and trays have been returned to the cage, check that they are correctly placed (the four legs of the trays must be in the load cell supports to correctly transmit weight to it).

4. System auto-calibration must be done without animals on the grid (during auto-calibration, the system detects the grid and tray weight and balances it to detect animal weight).

5. Although not required, it is better to wait 10 minutes after having turned on the equipment before placing animals on the grid (the system will reach a permanent thermal state in this period).

11.1. GRIDS CLEANING

When there is dirt in the grids the electrical shock flows through it. This will produce erroneous data during the experiment because the animal behaviour to the shock, negative reinforcement, will not be correct (it will not receive punishment).

In order to clean the grids you can use water and soap and then you must dry it. Grids sets can be removed from the trays in order to clean them. Be sure to dry well the DB9 connector otherwise contacts may rust with the time.

Special care must be taken in cleaning the plastic between bars, because urine is a good electrical conductor and current would flow through it

11.2. TRAYS CLEANING

Trays contains the grids and collects faeces and urine, they should be cleaned after each experiment, in order to clean them, you should remove them from the cage and then you can use a soapy solution and finally dry them.

11.3. TRNASPARENT DOORS CLEANING

WARNING: In order to clean the transparent doors never use neither alcohol nor alcoholic derived products, otherwise stripes will appear in the transparent plastic.

To clean the doors you can use a slightly wet cloth and then dry it with a dry cloth. If they're too dirty you can wet the cloth with a soapy solution, then remove foam with a wet cloth and finally dry them with a dry cloth.

11.4. WALLS CLEANING

To clean the walls you can use a slightly wet cloth and then dry them with a dry cloth. If they're too dirty you can wet the cloth with a soapy solution to clean them, then remove foam with a wet cloth and finally dry them with a dry cloth.

11.5. CLEANING THE ROUND TOP LIDS

These lids are made of the same material as transparent doors, so you should have the same precautions with them when cleaning, never use alcohol or detergents derived from alcohol, otherwise will appear stretch marks on the transparent plastic.

12. TROUBLESHOOTING

This table features instructions to solve the most frequent problems.

PROBLEM	SOLUTION
The equipment does not start up.	• Check the condition of the fuses.
The two white position leds are blinking.	• Ensure that the cable DB25 connects the cage and control unit. • Check that trays and grids are correctly placed. • If the cable is connected and all is correctly placed this means both load cells are damaged.
One of the white position leds is blinking.	• The load cell is damaged or blocked.
The door does not open.	• Check that door cable is connected. • Check that DB25 cable is connected. • Check that **Ready** led is on, if it's blinking system still is auto balancing and door will not work.
The acoustic stimulus does not work.	• Check that DB25 cable is connected. • Check that **Ready** led is on.
The light stimuli do not work.	• Check that light stimuli cables are connected. • Check that DB25 cable is connected. • Check that **Ready** led is on.
The control unit does not detect animal position.	• Check that **Ready** led is on. • Check that grids and trays are correctly placed. • Check that the RAT/MOUSE switch is in the correct position. (Rat weight threshold detection is 30gr, if you work with mice the equipment will not be able to detect them).

The animal does not receive shock.	• Check that DIN6 cable is connected between the shock generator and cage. • Check that the DB9 flat cables are connected between the grids and the cage. • Check that jack mono to green and black bananas is connected between control unit and LE100-26 Shocker. • Check that SHOCK/CALIBRATION switch in the shock generator is in the SHOCK position. • Check that the INTENSITY knob in the shock generator is set to a value higher than omA. • Check that the grid is clean (urine and excrements can conduct current).
The equipment does not communicate with **Shutavoid**.	• Make sure your equipment is connected to PC via RS-232. • Check that **Shutavoid** settings so that the serial port is correct. • Restart the equipment and the PC to do a RESET in communications. • Check in the rear panel of control unit that the ID number is the same that the one set in **Shutavoid.**

13. PREVENTIVE MAINTENANCE

	EXPERIMENT	MONTHLY
GRIDS CLEANING	☑	
TRAYS CLEANING	☑	
TRANSPARENT DOORS CLEANING		☑
TRANSPARENT ROUND TOP LIDS CLEANING		☑
WALLS CLEANING		☑
CHECK GRID AND TRAY PLACING	☑	

14. TECHNICAL SPECIFICATIONS

POWER SUPPLY	
Input voltage:	Universal input 100 - 240 VAC
Frequency:	50 /60 Hz
Fuse:	2 fuses 5x20mm 2A 250V Fast
Maximum Power:	18 W
Conducted Noise:	EN55022 /CISPR22/CISPR16 class B
ENVIRONMENTAL CONDITIONS	
Operating temperature:	10°C to +40°C
Operating Relative Humidity:	0% to 85% RH, non-condensing
Storage temperature:	0°C to +50°C, non-condensing
POSITION DETECTION	
Rat:	30 gr
Mouse:	7 gr
SOUND	
Frequency Range:	300 to 3000 Hz
Precision:	1%
LIGHT	
By leds (Not precise change)	
Power:	2 x 0.4W
Light stimulus intensity can be modified by using jumpers in lamp board.	
SW1	less light intensity
SW2	factory settings
SW3	more light intensity
DOOR	
Time open-closed	0.6s (mouse), 0.75s (rat)
Regulation open	Potentiometer PT5
Regulation closed	Potentiometer PT6
CONNECTOR MAIN, REMOTE	
Pin	Function
2	Rxd
3	Txd
5	Gnd
7	Rts
9	Cts
COMUNICATIONS OUTPUT	
Standard Interface:	RS232C
Connector:	Delta 9 contacts connector
Transmission speed:	19200 bauds, 8 bits, no parity
CONNECTOR LE2708	
Pin	Function
1	Door input

2	Sound Input
3	Light Input
4	Shock Input
5	Right Output
6	Left Output
7	Change Output
9	+ 5V
15	Gnd
CONNECTOR BOX	
Pin	Function
1	Door +
2	Door GND
6	Loudspeaker-Active
8	Loudspeaker-Gnd
10	Transducer left S-
11	Transducer left S+
12	Transducer Right S+
13	Transducer Right S-
14	Door-control
16	Light Right
17	Light Left
18	Light + 5V
20	Relays control
21	Relays +5V
23	Transducer +Exc (10V)
24	Transducer - Exc
25	Gnd
DIMENSIONS (Control Unit)	
Width x Height x Depth:	285mm x 70mm x 250mm
Weight:	1.84 kg

DIMENSIONS (Cage)

MODEL	Width	Height without door	Height with door	Depth	Weight
Units	mm	mm	mm	mm	kg
LE916 (rat)	582	330	416	362	14
LE918 (mouse)	582	330	416	362	11.5

DECLARACIÓN DE CONFORMIDAD
DECLARATION OF CONFORMITY
DECLARATION DE CONFORMITÉ

Nombre del fabricante: Manufacturer's name: Nom du fabricant:	**Panlab s.l.u.** www.panlab.com info@panlab.com
Dirección del fabricante: Manufacturer's address: Adresse du fabricant:	Energía, 112 08940 Cornellà de Llobregat Barcelona SPAIN
Declara bajo su responsabilidad que el producto: Declares under his responsibility that the product: Déclare sous sa responsabilité que le produit:	**SHUTTLE BOX CONTROL**
Marca / Brand / Marque:	**PANLAB**
Modelo / Model / Modèle:	**LE 916- LE 918**

Cumple los requisitos esenciales establecidos por la Unión Europea en las directivas siguientes:
Fulfils the essential requirements established by The European Union in the following directives:
Remplit les exigences essentielles établies pour l'Union Européenne selon les directives suivantes:

2006/95/EC	Directiva de baja tensión / Low Voltage / Basse tensión
2004/108/EC	Directiva EMC / EMC Directive / Directive CEM
2012/19/EU	La Directiva de Residuos de Aparatos Eléctricos y Electrónicos (WEEE) / The Waste Electrical and Electronic Equipment Directive (WEEE) / Les déchets d'équipements électriques et électroniques (WEEE)
2011/65/EU	Restricción de ciertas Sustancias Peligrosas en aparatos eléctricos y electrónicos (ROHS) / Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (ROHS) / Restriction de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques (ROHS)
2006/42/EC	Directiva mecánica / Machinery directive / Directive mécanique

Para su evaluación se han aplicado las normas armonizadas siguientes:
For its evaluation, the following harmonized standards were applied:
Pour son évaluation, nous avons appliqué les normes harmonisées suivantes:

Seguridad / Safety / Sécurité:	**EN61010-1:2011**
EMC:	**EN61326-1:2012 Class A[1]**
Safety of machinery:	**EN ISO 12100:2010**

[1]This equipment complies with the limits for class A equipment in accordance with CISPR 11 definition and is classed as a Class A digital device, pursuant to CFR Title 47 part 15 of the FCC Rules and is intended to be used in an industrial environment.

En consecuencia, este producto puede incorporar el marcado CE:
Consequently, this product can incorporate the CE marking:
En conséquence, ce produit peut incorporer le marquage CE:

CE

En representación del fabricante:
Manufacturer's representative:
En représentation du fabricant:

Carme Canalís
General Manager
Panlab s.l.u., a division of Harvard BioScience

Cornellà de Llobregat, Spain
15/10/2014

(GB) *Note on environmental protection:*

After the implementation of the European Directive 2002/96/EU in the national legal system, the following applies:
Electrical and electronic devices may not be disposed of with domestic waste.Consumers are obliged by law to return electrical and electronic devices at the end of their service lives to the public collecting points set up for this purpose or point of sale. Details to this are defined by the national law of the respective country. This symbol on the product, the instruction manual or the package indicates that a product is subject to these regulations. By recycling, reusing the materials or other forms of utilising old devices, you are making an important contribution to protecting our environment.

(E) *Nota sobre la protección medioambiental:*

Después de la puesta en marcha de la directiva Europea 2002/96/EU en el sistema legislativo nacional, Se aplicara lo siguiente:
Los aparatos eléctricos y electrónicos, así como pilas y baterías, no se deben tirar a la basura doméstica. El usuario está legalmente obligado a llevar los aparatos eléctricos y electrónicos, así como pilas y baterías, al final de su vida útil a los puntos de recogida municipales o devolverlos al lugar donde los adquirió. Los detalles quedaran definidos por la ley de cada país. El símbolo en el producto, en las instrucciones de uso o en el embalaje hace referencia a ello. Gracias al reciclaje, a la reutilización de materiales i a otras formas de reciclaje de aparatos usados, usted contribuirá de forma importante a la protección de nuestro medio ambiente.

(F) *Remarques concernant la protection de l'environnement :*

Conformément à la directive européenne 2002/96/CE, et afin d'atteindre un certain nombre d'objectifs en matière de protection de l'environnement, les règles suivantes doivent être appliquées.
Elles concernent les déchets d'équipement électriques et électroniques. Le pictogramme "picto" présent sur le produit, son manuel d'utilisation ou son emballage indique que le produit est soumis à cette réglementation. Le consommateur doit retourner le produit usager aux points de collecte prévus à cet effet. Il peut aussi le remettre à un revendeur.En permettant enfin le recyclage des produits, le consommateur contribuera à la protection de notre environnement. C'est un acte écologique.

(D) *Hinweis zum Umweltschutz:*

Ab dem Zeitpunkt der Umsetzung der europäischen Richtlinie 2002/96/EU in nationales Recht gilt folgendes:
Elektrische und elektronische Geräte dürfen nicht mit dem Hausmüll entsorgt werden. Der Verbraucher ist gesetzlich verpflichtet, elektrische und elektronische Geräte am Ende ihrer Lebensdauer an den dafür eingerichteten, öffentlichen Sammelstellen oder an die Verkaufstelle zurückzugeben. Einzelheiten dazu regelt das jeweilige Landesrecht. Das Symbol auf dem Produkt, der Gebrauchsanleitung oder der Verpackung weist auf diese Bestimmungen hin. Mit der Wiederverwertung, der stofflichen Verwertung oder anderer Formen der Verwertung von Altgeräten leisten Sie einen wichtigen Beitrag zum Schutz unserer Umwelt.

(I) *Informazioni per protezione ambientale:*

Dopo l'implementazione della Direttiva Europea 2002/96/EU nel sistema legale nazionale, ci sono le seguenti applicazioni:
I dispositivi elettrici ed elettronici non devono essere considerati rifiuti domestici. I consumatori sono obbligati dalla legge a restituire I dispositivi elettrici ed elettronici alla fine della loro vita utile ai punti di raccolta collerici preposti per questo scopo o nei punti vendita. Dettagli di quanto riportato sono definiti dalle leggi nazionali di ogni stato. Questo simbolo sul prodotto, sul manuale d'istruzioni o sull'imballo indicano che questo prodotto è soggetto a queste regole. Dal riciclo, e re-utilizzo del material o altre forme di utilizzo di dispositivi obsoleti, voi renderete un importante contributo alla protezione dell'ambiente.

(P) *Nota em Protecção Ambiental:*

Após a implementação da directiva comunitária 2002/96/EU no sistema legal nacional, o seguinte aplica-se:
Todos os aparelhos eléctricos e electrónicos não podem ser despejados juntamente com o lixo doméstico Consumidores estão obrigados por lei a colocar os aparelhos eléctricos e electrónicos sem uso em locais públicos especficos para este efeito ou no ponto de venda. Os detalhes para este processo são definidos por lei pelos respectivos países. Este símbolo no produto, o manual de instruções ou a embalagem indicam que o produto está sujeito a estes regulamentos. Reciclando, reutilizando os materiais dos seus velhos aparelhos, esta a fazer uma enorme contribuição para a protecção do ambiente.